THE TYPHOID FEVER DEATH RATE IN CALIFORNIA.*

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The typhoid fever death rate in California has been falling steadily since the year 1906, when authoritative statistics were first collected. Nevertheless, typhoid fever is still all too prevalent, and the State Board of Health is determined to bring about further marked reductions in the amount of this disease.

The typhoid death rate, expressed in the number of deaths per 100,000 of population is, at the present time in California, the only practical measure by which success in attempts to reduce typhoid fever can be gaged. The case rate, or morbidity rate, would be a better indicator of the success of preventive measures if it could be accurately ascertained. Too many cases of typhoid fever, however, go entirely unreported to make the morbidity rate a true picture of the condition with regard to typhoid fever in the state.

This incompleteness in the reporting of cases can be readily demonstrated. The number of deaths from typhoid fever, considering all cases, is decidedly less than ten per cent. of the number of cases, probably about five per cent. I believe, therefore, that I am conservative in estimating that for every death from typhoid fever in California there are nine cases which could be easily recognized and which terminate in recovery. On this basis there should be ten times as many cases of typhoid fever as deaths, granting that the reports of death are fairly reliable, which I believe they are. In the year 1914 there were 376 deaths from typhoid fever reported. This would indicate the existence of at least 3760 cases. In that year reports were received of only 1810 cases, 48 per cent. of the estimated number. To put the matter more strikingly, the records would appear to show that 20.8 per cent. of all cases of typhoid fever in California died—a ridiculous result! Further analysis of the records will show that this ratio between cases actually reported and cases estimated from the death rate varies greatly under the jurisdiction of different health departments. The following table shows the number of deaths per one hundred reported cases, for cities of over 25,000 population and a few counties having a high typhoid rate. The apparent case mortality is also shown:

TYPHOID FEVER—1914.

Cities with estimated populations of 25,000 and over	No. of Deaths	No. of Cases	Cases reported. Deaths per 100 reported Cases	Cases reported. Per cent. of the estimated number of cases
Alameda	2	19	10.5	95
Berkeley	4	27	14.8	67
Fresno	5	11	45.4	22
Long Beach	3	20	15.0	67
Los Angeles	33	256	12.9	78
Oakland	13	86	15.1	66
Pasadena	3	7	42.8	23
Sacramento	23	260	8.8	113
San Diego	10	11	90.9	11
San Francisco	57	274	20.8	48
San Jose	3	4	75.0	13
Stockton	12	14	85.7	11
COUNTIES:				
Amador	3	22	13.6	73
Butte	4	7	57.1	17
Colusa	6	16	37.5	27
Contra Costa	9	24	37.5	27
Fresno	14	27	51.8	19
Imperial	17	45	37.7	26
Kern	7	11	63.6	16
Kings	4	90	4.4*	225
Orange	13	35	37.1	26
Riverside	6	29	20.6	48
Santa Clara	11	24	45.8	22
Shasta	2	6	33.3	30
Siskiyou	3	7	42.8	23
Solano	3	12	25.0	40
Sonoma	10	108	9.2*	108
Stanislaus	4	11	36.4	27
Tehama	4	14	28.6	35
Tulare	5	23	21.7	46
Yolo	7	20	35.0	29

It is obvious, then, that, for the present, the only reliable index of progress in typhoid prevention is the typhoid death rate. In California the rate per 100,000 population is obtainable for the past eight years and shows a steady fall from 32.2 to 13.6, a reduction of 58 per cent. Nevertheless, there is still much room for improvement. As the rate becomes smaller, the difficulty of further reduction will become greater, but California is better prepared to prevent typhoid fever now than ever before.

In a comparison of the amount of typhoid fever in the various states, California holds a middle place. The latest complete official statistics are those published for the year 1913 by the United States Bureau of the Census. In that year, twelve states of the registration area had a worse rate than California and eleven made a better showing. The highest rate was 57.4 (North Carolina) and the lowest was 7.8 (Vermont). Five states had typhoid death rates below 10 per 100,000: Vermont, 7.8; Massachusetts, 7.9; Rhode Island, 8.3; Wisconsin, 9.0, and New Jersey, 9.6. Every effort will be made to bring California into this group within the next four years.

Within the state the prevalence of typhoid fever is far from uniform. In the counties bordering on the sea coast there is, in general, less typhoid fever than in those in the interior. The typhoid fever rates by counties for the years 1909 to 1914, inclusive, were compiled by Mr. Guy P. Jones and published in the monthly bulletin of the California State Board of Health for April, 1915. He showed that the rates for the various counties varied from zero to 64.7 and that the highest

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* Nearly all cases reported because of the presence of an epidemic.

rates were in the interior counties. The most alarming rates were in large part due to the use, for drinking purposes, of water from polluted streams, ditches, or wells.

In comparing the typhoid rates of our cities and our counties it must not be overlooked that one region may receive credit, or rather discredit, for cases imported, after infection in another place. It is customary for health officers of cities, in discussing the typhoid fever death rate within the areas of their jurisdiction, to state the true death rate and then to make reduction on the basis of imported cases. Sometimes the imported cases comprise a very large part of all the cases in a city. The process of excluding the imported cases from consideration must, to give correct results, be supplemented by the addition of cases infected within the city, but exported to other communities.

Another source of error in the comparison of communities lies in the fact that the counties are subdivisions too large for consideration as units, if the statistics regarding typhoid fever are to indicate the most important sources of infection. A county may contain a circumscribed area in which the danger from infection is very great, but the average death rate for the county may, nevertheless, be low.

It is desirable to make available all the statistics that can be obtained which will be useful to state and local health officers in the control of typhoid fever. To this end it is proposed to require more definite statistics regarding the origin of each case of typhoid fever and to distribute the information thus obtained, through the State Board of Health as a central office. For instance, if a city declares that certain cases are imported and should not be credited to that city, it will be incumbent upon the health officer to furnish the State Board of Health with a statement regarding the probable origin of each case. The State Board of Health, thereupon, will take the matter up with the health officer in the region which is the alleged source of infection and will request an investigation and a report. From all the information so obtained, it will usually be possible to decide where infection really took place.

In this way a corrected death rate for the state, by localities in which infection took place, can be arrived at, and attention will be called to local conditions which are responsible for keeping up our death rate. As soon as a given town or farm, or other subdivision of the state, is found to be a focus from which typhoid fever is being distributed, intensive preventive measures can be instituted there.

It is my intention to inaugurate this system so that it will be in full working order by the first of the coming year. Then it will be possible in the year 1916 to show definitely where most of our typhoid fever is coming from and to use the epidemiologists and engineers of the Board more effectively in attacking the disease at its source. At the end of the year we shall be able to supply a corrected, as well as an actual death rate, for various parts of the state and to construct a map showing accurately the areas of greatest prevalence.

The State Board of Health is carrying on an intensive campaign for the reduction of the typhoid rate. It is determined to reduce this rate from 13.6 to 9.6 in the four years from 1915 to 1918, inclusive. Present indications are that the reduction aimed at will be accomplished for this year. But, as the rate falls toward zero, the reduction will become more difficult, especially, if neighboring states permit a higher rate to exist. To announce a determination to attain a rate as low as 9.6 in four years seems daring, but the Board is confident of success, as it is in a position now to enforce stream pollution laws, and exercise supervision over sewage disposal and water supplies much more effectively than in the past.

The newly created Bureau of Sanitary Engineering is already actively engaged in making inspections and laying down the conditions upon which permits will be issued for the disposal of sewage or the selling of water for domestic purposes. This one activity, newly inaugurated, will, we hope, be very effective in the reduction of the typhoid rate.

In this campaign for the reduction of the typhoid fever rate, the sanitation of summer resorts and smaller rural communities, will be dealt with by the Sanitary Inspector of the State Board of Health. This inspector places emphasis particularly upon proper sewage disposal. Through his activities, conditions have already been greatly improved in many of our summer resorts. Shortly we expect to note a decided diminution in the so-called "Vacation Typhoid." The Board of Health intends to make the great parks and playgrounds of this state safe. Streams used for drinking purposes will be protected and those which cannot be kept unpolluted will be placarded, if they are in such a situation as to be convenient sources for drinking water.

The Bureau of Communicable Diseases, heretofore known as the Bureau of the Hygienic Laboratory, will play its important part in this reduction of typhoid fever. The epidemiologists and bacteriologists of that Bureau can carry on intensive investigations in those areas in which typhoid fever is prevalent, and ferret out the typhoid fever of obscure origin. It is this Bureau that will detect the more dangerous typhoid carriers and make it possible to place them under proper protection and isolation. It is this Bureau of Communicable Diseases that will help, further, by making such Widal tests and bacteriological examinations, as may be needed by the smaller communities and rural districts of the State to confirm the diagnosis of typhoid fever. It is this Bureau which assists materially in the reduction of typhoid fever by the manufacture and distribution of antityphoid vaccine, free, to physicians. I feel that the very decisive reduction in the typhoid rate in the year 1914, was, in part, at least, due to the extensive use of anti-typhoid vaccine, especially, in the immunization of nurses and persons in contact with the sick.

The individual physician and the local health officer will have to take a very important part in

this campaign. In the first place we must depend upon them for the complete reporting of all cases as well as deaths. I have already shown how incomplete the morbidity reports are, except in the presence of epidemics under investigation. If typhoid outbreaks are to be controlled at their beginning, it is necessary that information should be received regarding every case as soon as a diagnosis can be established. Investigation can then follow promptly. Great assistance can be rendered if the physician and local health officer will make vigorous attempts to locate the source of the infection and to give such instructions and to take such action as may be necessary to hold the disease in check until steps for permanent correction can be taken. In every case of typhoid fever inquiry should be made regarding the location of the patient at the probable time of infection, the drinking water supply and milk supply, and contacts with previous cases. These data should be forwarded to the local health officers, who, in turn, will keep the State Board of Health informed.

One very important part in the prevention of typhoid fever is almost entirely in the hands of the individual physician. He must see that proper bedside precautions are instituted to prevent the spread of typhoid fever within the household of the patient. Infection of the families of typhoid patients, and especially of those persons who care for the sick, have been common in California. Trained nurses have frequently been infected, and physicians should make it a rule never to place a nurse in charge of a case of typhoid fever unless she has been immunized. Those nurses who have not had the disease should be vaccinated against it.

Most important of all, physicians should see that the patient is properly isolated and that there are provisions in the sick room for proper washing of the hands of the attendant and of the physician. While investigating epidemics, I have frequently found that it was necessary to go to the kitchen sink to wash, after examining a typhoid patient.

As far as possible all typhoid fever cases should be cared for in hospitals or have the attention of trained nurses. If physicians will explain to families the risk of having the patient cared for by the same person who prepares the food for the family and waits on the children, more cases will go to the hospitals and more will be attended by nurses trained in the prevention of infection.

A circular containing the rules of the State Board of Health regarding the prevention of typhoid fever will be sent to any applicant on request.

If the plan of the State Board of Health for reducing the death rate to 9.6 per 100,000 population in four years is accomplished, it will mean the preventing of three hundred deaths from typhoid fever and over three thousand cases. This, however, is not the only reward. Hazen has estimated that, after water purification, for every reduction in the number of deaths from typhoid fever a certain number of other deaths have been avoided, probably two or three.

It is probable, therefore, that if sanitation in California is improved to such a point that a typhoid death rate as low as 9.6 is possible, the saving in disease and death will be several times as great as will be shown by the statistics for typhoid fever. The results certainly will more than justify the effort and the expense.

Note: Subsequent to the reading of this paper, the California mortality statistics for the latter part of 1915 have been collected, and their tabulation has been almost completed. It is now certain that the typhoid death rate per 100,000 population for 1915 lies between 9.6 and 9.8. The rate has fallen 29 per cent. in the past year and 70 per cent. in the last nine years. This improvement was beyond all expectations, and by 1918 the typhoid death rate in California should be as low as that of any other state.

ORAL HYGIENE—THE CARE OF THE MOUTH DURING ILLNESS.

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Mr. President, Members of the Alameda County District Dental Society, Ladies and Honored Guests:

In casting about for a subject upon which to address you this evening, this thought occurred to me to ask, "What prophylactic care is usually given to the mouth and teeth of those persons who are seriously ill, in our homes and hospitals?" And I was forced to answer—practically none. And yet it is during these periods that much of the damage, sometimes irreparable, is done to the teeth and oral tissues. This is a much-neglected department of prophylaxis and for that reason I have chosen to speak upon it this evening.

THE CARE OF THE HUMAN MOUTH DURING ILLNESS.

At no time in the history of the individual is the proper hygienic care of the mouth of so much importance as when suffering from severe and prolonged illness; especially the continued and intermittent fevers, tuberculosis, acute articular rheumatism, nervous prostration, and during pregnancy and lactation.

During these periods there is always a marked change in the character of the oral secretions; instead of being neutral in re-action, they are almost invariably acid; while the patient will often complain of a "bad taste in the mouth." These conditions are due to perverted nutrition, faulty metabolism and the action of the mouth bacteria in an unclean mouth.

Your essayist is fully aware, however, that in the light of recent research in relation to the influences of the internal secretions upon special and general bodily functions; that we may have, if these laboratory findings are substantiated, to modify our theories as to the causes of perverted nutrition, faulty metabolism and abnormal secretions. Discoveries have recently been made, in relation to "susceptibility and immunity to dental caries," which also, if substantiated by other research workers, will greatly modify, if not completely change our present views in relation to these conditions. There has not been during the last half of a century so much of the spirit of "I want to know" as at the present time. The profession is beginning to question, and that right seriously,